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症 例

Ascending Aorta-bilateral Femoral Arteries Bypass via Preperitoneal Route of Ventral Abdominal Wall

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Axillofemoral bypass procedure for aortoiliac arterial occlusion has been widely employed in critical situations. Because of less favorable long-term patency of this bypass than that of aortofemoral bypass, alternate extraanatomical bypass is still looked for.

The authors report a case of an extraanatomic bypass. In this patient of septic false aneurysm of left common iliac artery, reconstruction by anatomical route was hazardous. After installing axillofemoral bypass with femorofemoral cross-over bypass which thrombosad, an ascending aorta-bilateral femoral bypass procedure by route of preperitoneal space of ventral abdominal wall was performed with satisfactory long-term patency.

Case Report

A 68 year old man developed left lower abdominal and lumbar pain, abdominal distension and fever 2 weeks prior to the admission. There was marked abdominal tenderness on palpation. Arteriogram revealed fusiform aneurysm of left common iliac artery (Figure 1). CT scanning revealed dilatation and calcification of that artery surrounded by hematomatous shadow. Blood analysis showed hemoconcentration with leucocytosis. RBC was 599×10^4 . Hb was 19.7 g/dl. WBC was 14,000. From these symptoms and findings, impending rupture of left common iliac aneurysm was highly suspected.

On July 2, 1982, emergency surgery was performed. By midline incision abdominal cavity was entered. Fist-sized aneurysm was noticed over the aortic bifurcation extending to the left common iliac artery. Incision of the aneurysm revealed that it was a false aneurysm caused by the perforation of sclerotic dilated left common iliac artery. Aneurysmectomy was performed by resecting entire left common iliac artery and removing hematoma. While evacuating hematoma, purulent discharge was noticed in which by later examination *E. coli* was demonstrated. In order to avoid catastrophic artificial graft infection, no artificial graft was used. Femoro-

Key words: Arterial reconstruction, Arterial bypass, Infected aneurysm, Extraanatomic bypass, Arterial obstruction.

索引語: 動脈閉塞, 血行再建, 動脈バイパス手術, 感染性動脈瘤, 非解剖的バイパス.

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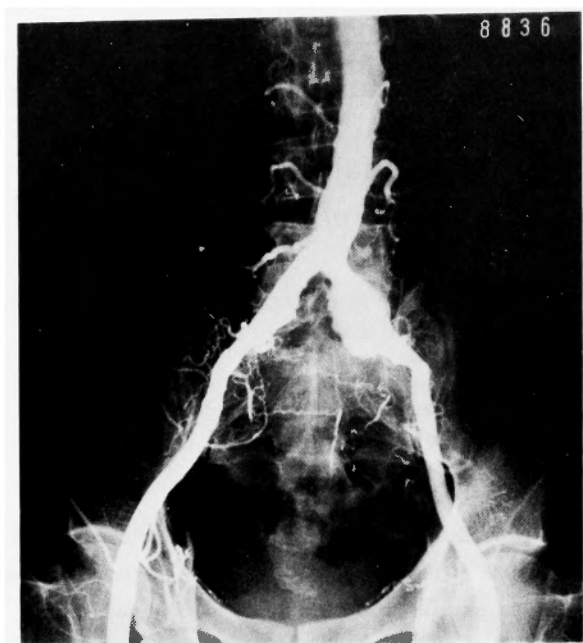


Figure 1. Preoperative angiogram
Aneurysm of left common iliac artery is demonstrated.

femoral cross-over bypass was installed subcutaneously. Aortic opening was closed by double over and over suture with 4-0 polypropylene suture. Left external and internal iliac arteries were closed by running suture and ligature.

On the 20th postoperative day, patient developed a huge retroperitoneal hematoma caused by the rupture of sutured opening of aortic bifurcation. It was noticed that hematoma was mixed with pus. After evacuation of the hematoma, ruptured site was again closed by resuturing. Next day, it ruptured again going into shock. Abdominal aorta was ligated at a site below the origin of renal arteries. Since the wall of right iliac artery was also very brittle it was obligatory to ligate right external and internal iliac arteries. Right axillofemoral bypass was installed with a 8 mm double velour Dacron graft. Blood supply to the left lower extremity was maintained via femorofemoral bypass which had been set at the initial operation. Inferior mesenteric artery was ligated while resecting aneurysm and evacuating hematoma. Since both internal iliac arteries were also ligated, it was necessary to resect ischemic sigmoidal colon and place a colostomy. On the 29th day after this third operation, axillofemoral bypass graft was thrombosed, necessitating thrombectomy by Fogarty catheter. Patient was placed on Warfarin, Urokinase and Ticlopidine therapy for subsequent anticoagulation. However, 54 days after this thrombectomy, axillofemoral bypass graft thrombosed again. Although thrombectomy was again performed, it was estimated that this axillofemoral bypass might not be reliable at all. Another extraanatomic bypass was placed between ascending aorta and bilateral common femoral arteries (Figure 2). Surgical procedures employed for this bypass operation were as follows.

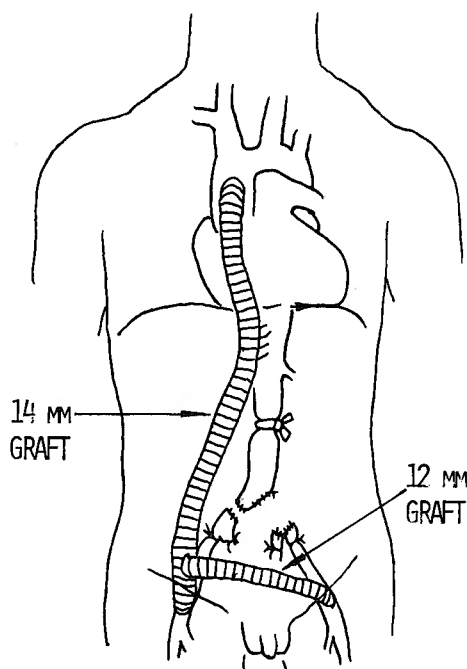


Figure 2. Diagram of Ascending aorta-bilateral femoral arteries bypass

Chest was opened by midsternal incision. Pericardium was opened longitudinally. At both groins vertical incisions were placed. Right pararectal incisions of 5 cm in length were placed at the upper and lower parts of right abdomen. Rectus muscle was retracted inward. Its posterior fascia was incised. Then the space between peritoneum and rectus muscle was tunneled so that the bypass graft could occupy that space freely. To the side of ascending aorta one end of 14 mm double velour Dacron graft was anastomosed. Distal end of the graft was anastomosed to the side of right common femoral artery. At 4 cm proximum of this distal anastomosis, 12 mm Dacron graft was attached by side to end anastomosis as the contralateral limb, being connected to the side of left common femoral artery. Previous axillofemoral and femorofemoral bypasses of subcutaneous route were removed.

Following this last surgery, blood supply to the lower extremities is well maintained. This patient has been placed on Ticlopidine therapy and are doing well over 1 year since this last surgery. Right and left ancle pressure indices are 1.14 and 1.2 respectively. Postoperative angiogram revealed good patency of the grafts (Figure 3, 4).

Discussion

Satisfactory results of long-term patency of aortofemoral bypass procedure for the obstruction of aortoiliac artery has been well established^{3,7)}. However, there exist certain limitations for operative indication. Such patients with poor risk, intraabdominal infection, multiple previous abdominal operations, complete replacement of aortic lumen by solid fibrous cord, aortic dissection are often excluded from being treated with this procedure^{4,5,6)}.

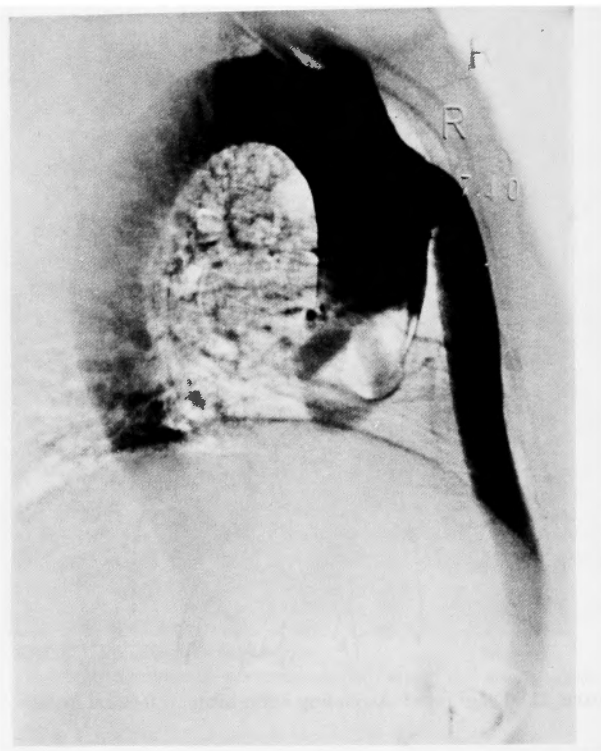


Figure 3. Postoperative subtraction angiogram
Proximal portion of ascending aorta-bilateral femoral arteries bypass is well visualized.

In 1963, *Blaidell* and *Hall*²⁾ described a procedure of axillofemoral bypass for lower extremity ischemia by subcutaneous route. Long-term result of this axillofemoral bypass has not been as excellent as that of aorto-femoral bypass⁷⁾. *Mannick*⁵⁾ et al. mentioned three features associated with graft failure of this bypass procedure. These included wrong positioning which graft was placed in, formation of “Y” at the proximal anastomosis and inadequate outflow. At the same time, as the drawbacks of this procedure, they mentioned that graft was long and was subject to compression from various articles of clothing and by the patient's body. In his case, 20% of the graft were occluded 0 to 1/2 years after operation.

There are several methods with which graft does not need to course over the rib cage. *Nunn* et al.⁶⁾ described a route of bypass extending from the distal descending thoracic aorta to the common femoral arteries. This bypass can be placed with the use of left thoraco-abdominal incision and bilateral groin incisions. *Frantz* et al.⁹⁾ reported ascending aorta-bilateral femoral arteries bypass. According to their report, a graft was brought intraperitoneally and then retroperitoneally and sutured to the femoral arteries bilaterally. *Baird* et al.¹⁾ described an alternate method. After leaving the mediastinum, the graft was laid in the subcutaneous position throughout its course. They suggested that this bypass was relatively atraumatic, technically simple and permanent due to large inflow.

In this present report, the authors employed ascending aorta-bilateral femoral arteries



Figure 4. Postoperative angiogram
Distal portion of ascending aorta-bilateral femoral arteries bypass is well visualized.

bypass procedure by preperitoneal route. This procedure needs no laparotomy. It is expected that preperitoneal bypass is less liable to the compression by outside articles than subcutaneous bypass. This patient has been well for over one year with satisfactory opacification of the graft and dependent arteries by angiography.

Summary

A sixty-eight year old man was operated on for the septic false aneurysm. After experiencing ing repeated thrombosis of axillofemoral bypass, patient was placed with ascending aorta-bilateral femoral arteries bypass via preperitoneal route. Implanted graft is patent and patient is doing well over one year after surgery.

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和文抄録

腹膜前経路による上行大動脈一両側大腿動脈間バイパス法

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鯉江 久昭, 高谷 俊一, 田中 正彦, 工藤 堯史

68才男性の感染性左総腸骨動脈仮性動脈瘤症例に手術を行い, 当初右 axillofemoral bypass 及び femoro-femoral cross-over bypass を設置したが2回の axillofemoral bypass 人工血管血栓性閉塞のため, 上行大動脈一両側大腿動脈間バイパス設置を行った. そのバ

イパス経路は, 従来報告されている前腹壁皮下経路や, 後腹膜腔経路をとらず, 前腹壁, 前腹膜経路をとった. 術後1年余の現在, バイパスは開存し患者は元気である. 非解剖的バイパスとして本経路の有用性について述べた.